

# PATENT COOPERATION TREATY

## PCT

REC'D 31 AUG 2001

WIPO PCT

### INTERNATIONAL PRELIMINARY EXAMINATION REPORT

(PCT Article 36 and Rule 70)

Applicant's or agent's file reference E 1371 PCT		<b>FOR FURTHER ACTION</b> See Notification of Transmittal of International Preliminary Examination Report (Form PCT/IPEA/416)	
International application No. PCT/US99/12687	International filing date (day/month/year) 07/06/1999	Priority date (day/month/year) 07/06/1999	
International Patent Classification (IPC) or national classification and IPC C08G18/50			
Applicant 3M INNOVATIVE PROPERTIES COMPANY			

**RECEIVED**

NOV 16 2001


**TC 1700**

1. This international preliminary examination report has been prepared by this International Preliminary Examining Authority and is transmitted to the applicant according to Article 36.
2. This REPORT consists of a total of 6 sheets, including this cover sheet.
  - ☒ This report is also accompanied by ANNEXES, i.e. sheets of the description, claims and/or drawings which have been amended and are the basis for this report and/or sheets containing rectifications made before this Authority (see Rule 70.16 and Section 607 of the Administrative Instructions under the PCT).

These annexes consist of a total of 7 sheets.

3. This report contains indications relating to the following items:

- I ☒ Basis of the report
- II ☐ Priority
- III ☐ Non-establishment of opinion with regard to novelty, inventive step and industrial applicability
- IV ☐ Lack of unity of invention
- V ☒ Reasoned statement under Article 35(2) with regard to novelty, inventive step or industrial applicability; citations and explanations supporting such statement
- VI ☐ Certain documents cited
- VII ☐ Certain defects in the international application
- VIII ☒ Certain observations on the international application

Date of submission of the demand 09/03/2000	Date of completion of this report 29.08.2001
Name and mailing address of the international preliminary examining authority:  European Patent Office D-80298 Munich Tel. +49 89 2399 - 0 Tx: 523656 epmu d Fax: +49 89 2399 - 4465	Authorized officer Lartigue, M-L Telephone No. +49 89 2399 8230



# INTERNATIONAL PRELIMINARY EXAMINATION REPORT

International application No. PCT/US99/12687

## I. Basis of the report

1. With regard to the **elements** of the international application (*Replacement sheets which have been furnished to the receiving Office in response to an invitation under Article 14 are referred to in this report as "originally filed" and are not annexed to this report since they do not contain amendments (Rules 70.16 and 70.17):*)

Description, pages:

1-31,33-38 as originally filed

32 as amended under Article 19

### Claims, No.:

2,5-8,18-20,23, as originally filed  
25-37

1,3,4,9-17,21,22, as received on 17/07/2001 with letter of 17/07/2001  
24

2. With regard to the **language**, all the elements marked above were available or furnished to this Authority in the language in which the international application was filed, unless otherwise indicated under this item.

These elements were available or furnished to this Authority in the following language: , which is:

- ☐ the language of a translation furnished for the purposes of the international search (under Rule 23.1(b)).
- ☐ the language of publication of the international application (under Rule 48.3(b)).
- ☐ the language of a translation furnished for the purposes of international preliminary examination (under Rule 55.2 and/or 55.3).

3. With regard to any **nucleotide and/or amino acid sequence** disclosed in the international application, the international preliminary examination was carried out on the basis of the sequence listing:

- ☐ contained in the international application in written form.
- ☐ filed together with the international application in computer readable form.
- ☐ furnished subsequently to this Authority in written form.
- ☐ furnished subsequently to this Authority in computer readable form.
- ☐ The statement that the subsequently furnished written sequence listing does not go beyond the disclosure in the international application as filed has been furnished.
- ☐ The statement that the information recorded in computer readable form is identical to the written sequence listing has been furnished.

4. The amendments have resulted in the cancellation of:

☐ the description, pages:

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EXAMINATION REPORT**

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- ☐ the claims, Nos.:  
☐ the drawings, sheets:

5. ☒ This report has been established as if (some of) the amendments had not been made, since they have been considered to go beyond the disclosure as filed (Rule 70.2(c)):

*(Any replacement sheet containing such amendments must be referred to under item 1 and annexed to this report.)*  
**see separate sheet**

6. Additional observations, if necessary:

**V. Reasoned statement under Article 35(2) with regard to novelty, inventive step or industrial applicability; citations and explanations supporting such statement**

1. Statement

Novelty (N)	Yes:	Claims	1-3, 5-20, 26-28, 32, 34-35
	No:	Claims	4, 21-25, 29-31, 33, 36-37
Inventive step (IS)	Yes:	Claims	
	No:	Claims	1-3, 5-20, 26-28, 32, 34-35
Industrial applicability (IA)	Yes:	Claims	1-37
	No:	Claims	

2. Citations and explanations  
**see separate sheet**

**VIII. Certain observations on the international application**

The following observations on the clarity of the claims, description, and drawings or on the question whether the claims are fully supported by the description, are made:  
**see separate sheet**

**INTERNATIONAL PRELIMINARY  
EXAMINATION REPORT - SEPARATE SHEET**

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**Re Item I**

**Basis of the report**

The amendments filed with the letter dated 17.07.2001 introduce subject-matter which extends beyond the content of the application as filed, contrary to Article 34(2)(b) PCT. The claim concerned is claim 24, because a polyurea-based copolymer including a segment B **comprising less than 75% polysiloxane segments based on total weight of the polyurea-based polymer**, is not disclosed in the application as originally filed.

Therefore, the present report has been established on the basis of claim 24 as originally filed.

**Re Item V**

**Reasoned statement under Article 35(2) with regard to novelty and inventive step; citations and explanations supporting such statement**

Reference is made to the following document:

**D1: EP 0 380 236 A**

1. NOVELTY (Art. 33(2) PCT): the subject-matter of present claims 4, 21-25, 29-31, 33 and 36-37 is not novel over D1.

D1 is taken to represent the closest prior art, because D1 discloses organopolysiloxane-polyurea block copolymers which are particularly useful, when tackified with a compatible tackifier resin, as pressure sensitive adhesive compositions (see D1, p. 3, l. 1-3). Examples 21-29 of D1 (see D1, from p. 14, l. 20 to p. 16, l. 25) disclose the preparation of such pressure-sensitive adhesive compositions by 1) providing at least one polyisocyanate and at least one polyamine; 2) reacting the at least one polyisocyanate with the at least polyamine to form the polyurea-based polymer; and 3) adding the tackifier. The peel adhesion and shear strength values of the resulting compositions were measured according to ASTM P3330-78; PSTC-1 and ASTM D3654-78; PSTC-7, respectively, i.e. under the same conditions as in the present application (see D1 from p. 14, l. 40 to p. 15, l. 20). Hence, the results are comparable.

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International application No. PCT/US99/12687

D1 also discloses the coating of said polyurea pressure-sensitive adhesives onto tapes by hot melt extrusion processes (see D1, p. 9, l. 44).

- 1.1. In examples 21-29 of D1, the adhesive compositions comprise a polyurea-based polymer and **50 parts by weight tackifier** per hundred parts by weight polyurea-based polymer. Consequently, the subject-matter of present independent claim 1 is novel over D1.

Claims 2-3 and 5-20 are dependent on claim 1 and as such also meet the requirements of the PCT with respect to novelty.

Since claim 1 is novel, the subject-matter of present claims 26-28 is novel.

Although the subject-matter of present claim 4 depends on present claim 1, it is not novel over D1 (see D1, Examples 21-29, p. 15, Table III and p. 16, Table IV). As a matter of fact, the adhesive composition of present claim 4 comprises more than 45 parts by weight tackifier per hundred parts by weight of polyurea-based polymer.

- 1.2. All the technical features that define the subject-matter of present claims 21 to 25 are disclosed in D1 (see D1, Examples 2 and 19 and p. 9, l. 36-44). Hence, the subject-matter of present claims 21 to 25 is not novel over D1.

The subject-matter of present claims 22 and 24 being not novel, the subject-matter of present claims 29-30 is not novel either.

- 1.3. The method as claimed in present claims 31, 33, 36 and 37 is not novel over D1. Statements such as "of preparing the adhesive composition of claim 1" or "of preparing the adhesive composition of claim 22" cannot establish the novelty of said claims 31 and 36 respectively. As a matter of fact, since the methods of D1 are characterized by the same technical features as the methods of present claims 31, 33, 36 and 37, they are also suitable for the preparation of the adhesive compositions according to the present application.

Consequently, the subject-matter of present claims 31, 33, 36 and 37 is not novel.

2. INVENTIVE STEP (Art. 33(3) PCT): the subject-matter of present claims 1-3, 5-20, 26-28, 32, 34 and 35 does not involve an inventive step.

- 2.1. The adhesive composition as defined in present claim 1 only differs from that of D1,

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Examples 21-29, in the amount of tackifier involved.

The problem to be solved by the present application is to provide an adhesive composition which does not require more than 45 parts by weight tackifier per hundred parts by weight polyurea-based polymer to exhibit a peel adhesion of greater than 10,0 N/dm.

The subject-matter of present claim 1 does not involve an inventive step because the technical problem has not been solved. As a matter of fact, the specific structure of the polyurea-based copolymer which could confer, in the presence of less than 45 parts by weight tackifier, the desired adhesive property to the claimed composition is not disclosed in present claim 1.

The same applies to the subject-matter of present claims 2-3 and 5-20.

The subject-matter of present claims 26 to 28 involves the adhesive composition of present claim 1 and, therefore, also lacks an inventive step.

- 2.2. Dependent claims 32, 34 and 35 do not contain any feature which, in combination with the features of claim 31 to which they refer, meet the requirements of the PCT in respect of inventive step, because it is not apparent from the present description what problem is solved by the distinguishing features vis-à-vis D1.

**Re Item VIII**

**Certain observations on the international application**

1. The statement in present claim 1 "wherein the polyurea-based polymer does not require greater than about 45 parts by weight tackifier per hundred parts by weight polyurea-based polymer to exhibit....stainless steel substrate." tries to define the subject-matter in terms of the result to be achieved. In this instance the use of such a formulation renders the claim unclear in scope and is not justified by the disclosed means of achieving the desired result. Claim 1 does not satisfy the requirements of Art. 6 PCT, see Guidelines C-III, 4.7.
2. According to the PCT International Preliminary Examination Guidelines, an independent claim should clearly specify all of the essential features needed to define the invention (see Chapter III, paragraph 4.4.). It does not seem to be the case in the present application.

was placed 20.0 grams of JEFFAMINE D2000 and 63.0 grams of 2-propanol to yield a homogenous solution. To this solution was added, with mixing, 1.57 grams of TMXDI. After one hour of stirring, 1.36 grams of DYTEK A and 4.03 grams of DESMODUR W H12MDI were added, and the resulting mixture was mixed for one day. The solution viscosity rose during this mixing.

A tackifier solution of 16.18 grams of NIREZ 2019 in 37.7 grams of toluene was added to the polymer solution. The resulting solution was cast onto PET and dried at 70°C for 10 minutes to yield a 25 micrometer-thick coating. The peel adhesion, shear strength and tackifier level values for this adhesive are recorded in Table 3.

#### Example 25

The same polymer solution synthesis of Example 1~~X~~<sup>0</sup> was repeated, except a ~~lower~~ higher level of tackifier was used. In a glass reactor equipped with a magnetic stirrer was mixed 149.6 grams of JEFFAMINE D2000, 26.4 grams of JEFFAMINE ED2001, 0.54 gram of DYTEK A and 467.0 grams of 2-propanol, to yield a homogenous solution. To this was added, with mixing, 23.46 grams of DESMODUR W H12MDI and the resulting mixture was mixed for one day. The solution viscosity rose during this mixing.

A tackifier solution of 140.0 grams of NIREZ 2019 in 327.0 grams of toluene was added to the polymer solution. The resulting solution was cast onto PET and dried at 70°C for 10 minutes to yield a 25 micrometer-thick coating. The peel adhesion, shear strength and tackifier level values for this adhesive are recorded in Table 3.

#### Example 26

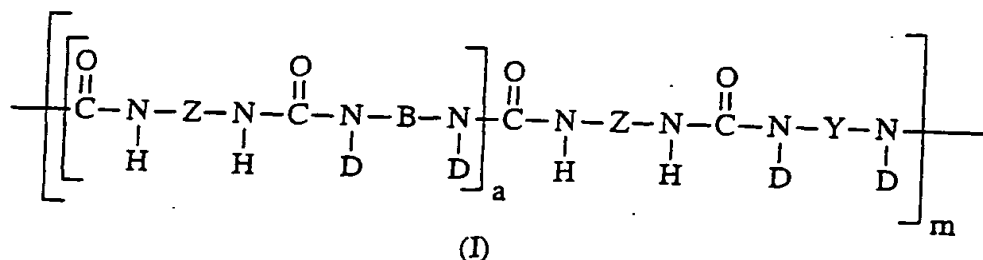
The same polymer solution synthesis of Example 14 was repeated, except a higher level of tackifier was used. In a glass reactor equipped with a magnetic stirrer was placed 20.0 grams of JEFFAMINE D2000 and 63.0 grams of 2-propanol to yield a homogenous solution. To this solution was added, with mixing, 1.18 grams of TMXDI. After one hour of stirring, 1.20 grams of DYTEK A and 4.08 grams of DESMODUR W H12MDI were added, and the resulting mixture was mixed for one day. The solution viscosity rose during this mixing.

AMENDED SHEET

17. Juli 2001

What Is Claimed Is:

1. An adhesive composition comprising a polyurea-based polymer, wherein the polyurea-based polymer does not require greater than ~~about~~ 45 parts by weight tackifier per hundred parts by weight polyurea-based polymer to exhibit a peel adhesion of greater than ~~about~~ 10.0 N/dm when tested according to ASTM D 3330-90, wherein ASTM D 3330-90 is modified by substituting a glass substrate for a stainless steel substrate.
2. The composition of claim 1, further comprising a tackifier.
3. The composition of claim 2, wherein the composition comprises up to ~~about~~ 45 parts by weight tackifier per hundred parts by weight polyurea-based polymer.
4. The composition of claim 2, wherein the composition comprises greater than ~~about~~ 45 parts by weight tackifier per hundred parts by weight polyurea-based polymer.
5. The composition of claim 1, wherein the polyurea-based copolymer comprises a segmented copolymer, which copolymer comprises repeating units of Formula I:



wherein:

- each B is independently a polyvalent radical;
- each D is independently selected from the group consisting of hydrogen, an alkyl group, a cycloalkyl group, a phenyl group, a group that completes a ring structure that includes B to form a heterocycle, and mixtures thereof;
- each Z is independently a polyvalent radical;
- each Y is independently a polyoxyalkylene;
- m is an integer greater than zero; and



a is zero or an integer greater than zero.

6. The composition of claim 5, wherein B is a polyoxyalkylene.
- 5 7. The composition of claim 5, wherein Y is selected from the group consisting of polyethylene oxide, polypropylene oxide, and polytetramethylene oxide.
8. The composition of claim 5, wherein a is an integer greater than zero.
- 10 9. The composition of claim 1, wherein the composition exhibits a peel adhesion of greater than ~~about~~ 20.0 N/dm when tested according to ASTM D 3330-90, wherein ASTM D 3330-90 is modified by substituting a glass substrate for a stainless steel substrate.
- 15 10. The composition of claim 1, wherein the composition exhibits a shear strength of greater than ~~about~~ one minute when tested according to ASTM D 3654-88.
- 20 11. The composition of claim 1, wherein the composition exhibits a shear strength of greater than ~~about~~ 10 minutes when tested according to ASTM D 3654-88.
12. The composition of claim 1, wherein the composition exhibits a shear strength of greater than ~~about~~ 100 minutes when tested according to ASTM D 3654-88.
- 25 13. The composition of claim 1, wherein the polyurea-based polymer comprises a segmented copolymer, wherein at least ~~about~~ 0.5 mole fraction of linkages between segments in a backbone of the polymer are urea linkages.
14. The composition of claim 1, wherein the polyurea-based polymer comprises a segmented copolymer, wherein at least ~~about~~ 0.75 mole fraction of linkages between  
30 segments in a backbone of the polymer are urea linkages.
15. The composition of claim 1, wherein the polyurea-based polymer comprises a segmented copolymer, wherein at least ~~about~~ 0.95 mole fraction of linkages between segments in a backbone of the polymer are urea linkages.

16. The composition of claim 1, wherein the polyurea-based polymer comprises less than ~~about~~ 75 weight % polysiloxane segments based on total weight of the polyurea-based polymer.

5

17. The composition of claim 1, wherein the polyurea-based polymer comprises less than ~~about~~ 50 weight % polysiloxane segments based on total weight of the polyurea-based polymer.

10 18. The composition of claim 1, wherein the composition further comprises an acid-containing polymeric material.

19. The composition of claim 1, wherein the composition is a pressure-sensitive-adhesive.

15

20. The composition of claim 1, wherein the composition is a heat-activatable adhesive.

21. A heat-activatable adhesive composition comprising:

20 a polyurea-based polymer, and  
optionally, at least one tackifier,

wherein the composition exhibits a peel adhesion of greater than ~~about~~ 10.0 N/dm when tested according to ASTM D 3330-90, wherein ASTM D 3330-90 is modified by substituting a glass substrate for a stainless steel substrate and adding a step of using sufficient heat to bond the heat-activatable composition to the glass substrate.

25

comprising less than ~~about~~ 75% polysiloxane segments based on total weight of the polyurea-based polymer

22. An adhesive composition comprising:

30 a polyurea-based polymer, and  
optionally, at least one tackifier,

wherein the polyurea-based polymer comprises less than ~~about~~ 75 weight % polysiloxane segments based on total weight of the polyurea-based polymer and wherein the adhesive composition is one of a pressure-sensitive adhesive composition and a heat-activatable adhesive composition.

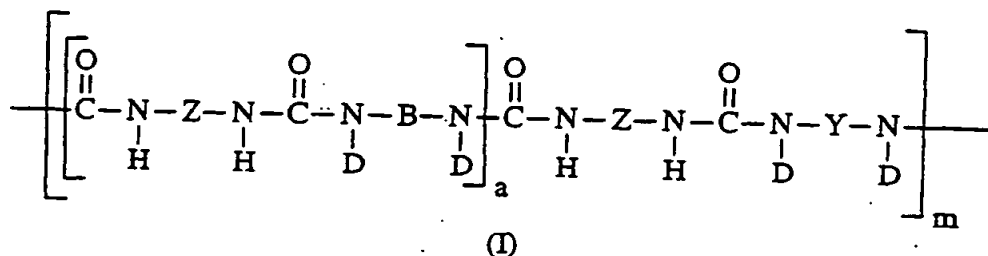
23. The adhesive composition of claim 22, wherein the adhesive composition is a pressure-sensitive adhesive composition.

24. An adhesive composition comprising:

a polyurea-based polymer; and

optionally, at least one tackifier,

wherein the polyurea-based copolymer comprises a segmented copolymer, which copolymer comprises repeating units of Formula I:



wherein:

each B is independently a polyvalent radical[-]

each D is independently selected from the group consisting of hydrogen, an alkyl group, a cycloalkyl group, a phenyl group, a group that completes a ring structure that includes B to form a heterocycle, and mixtures thereof;

each Z is independently a polyvalent radical;

each Y is independently a polyoxyalkylene;

m is an integer greater than zero; and

a is an integer greater than or equal to zero, and

wherein the adhesive composition is one of a pressure-sensitive adhesive composition and a heat-activatable adhesive composition.

25. The adhesive composition of claim 24, wherein the adhesive composition is a pressure-sensitive adhesive composition.

26. An adhesive tape comprising:

a backing; and

the adhesive composition of claim 1 coated on at least a portion thereof.

75% polysiloxane segments based on total weight of the polyurea-based polymer; [ , and comprises less than about

27. The adhesive tape of claim 26, wherein the backing comprises a polyurea.
28. The adhesive tape of claim 26, further comprising a release material coated on at least a portion of the backing, on a side of the backing opposite of the adhesive.
- 5 29. An adhesive tape comprising:  
a backing; and  
the adhesive composition of claim 22 coated on at least a portion thereof.
- 10 30. An adhesive tape comprising:  
a backing; and  
the adhesive composition of claim 24 coated on at least a portion thereof.
- 15 31. A method of preparing the adhesive composition of claim 1, the method comprising the steps of:  
providing at least one polyisocyanate;  
providing at least one polyamine;  
reacting the at least one polyisocyanate with the at least polyamine to form the  
polyurea-based polymer; and  
20 optionally adding the tackifier to the polyurea-based polymer.
32. The method of claim 31, wherein at least one polyisocyanate and the at least one polyamine are reacted by reactive extrusion.
- 25 33. The method of claim 31, further comprising the step of hot-melt coating the adhesive composition onto a substrate.
34. The method of claim 31, further comprising the step of solvent coating the adhesive composition onto a substrate.
- 30 35. The method of claim 31, wherein the polyurea-based polymer is polymerized on-web.

36. A method of preparing the adhesive composition of claim 22, the method comprising the steps of:

providing at least one polyisocyanate;

providing at least one polyamine;

5 reacting the at least one polyisocyanate with the at least polyamine to form the polyurea-based polymer; and

optionally adding the tackifier to the polyurea-based polymer.

37. A method of preparing the adhesive composition of claim 24, the method comprising the steps of:

10 providing at least one polyisocyanate;

providing at least one polyamine;

reacting the at least one polyisocyanate with the at least polyamine to form the polyurea-based polymer; and

15 optionally adding the tackifier to the polyurea-based polymer.

(19) World Intellectual Property Organization  
International Bureau



(43) International Publication Date  
14 December 2000 (14.12.2000)

PCT

(10) International Publication Number  
**WO 00/75210 A1**

- (51) International Patent Classification<sup>7</sup>: C08G 18/50, C09J 175/02, 175/12
- (21) International Application Number: PCT/US99/12687
- (22) International Filing Date: 7 June 1999 (07.06.1999)
- (25) Filing Language: English
- (26) Publication Language: English
- (71) Applicant (for all designated States except US): 3M INNOVATIVE PROPERTIES COMPANY [US/US]; 3M Center, P.O. Box 33427, Saint Paul, MN 55133-3427 (US).
- (72) Inventors; and
- (75) Inventors/Applicants (for US only): KINNING, David, J. [US/US]; 6778 Sherwood Circle, Woodbury, MN 55125 (US). LEIR, Charles, M. [US/US]; 1463 West Hoyt Avenue, Falcon Heights, MN 55108 (US). SHERMAN, Audrey, A. [US/US]; 1746 East Fourth Street, St. Paul, MN 55106 (US). DASTUR, Meherdil, D. [US/US]; Apt. 33, 1121 North Hamline Avenue, Saint Paul, MN 55108 (US).
- (74) Agents: MCGEEHAN, Lisa, M. et al.; 3M Innovative Properties Company, Office of Intellectual Property Counsel, P.O. Box 33427, Saint Paul, MN 55133-3427 (US).
- (81) Designated States (national): AE, AL, AM, AT, AU, AZ, BA, BB, BG, BR, BY, CA, CH, CN, CU, CZ, DE, DK, EE, ES, FI, GB, GD, GE, GH, GM, HR, HU, ID, IL, IN, IS, JP, KE, KG, KP, KR, KZ, LC, LK, LR, LS, LT, LU, LV, MD, MG, MK, MN, MW, MX, NO, NZ, PL, PT, RO, RU, SD, SE, SG, SI, SK, SL, TJ, TM, TR, TT, UA, UG, US, UZ, VN, YU, ZA, ZW.
- (84) Designated States (regional): ARIPO patent (GH, GM, KE, LS, MW, SD, SL, SZ, UG, ZW), Eurasian patent (AM, AZ, BY, KG, KZ, MD, RU, TJ, TM), European patent (AT, BE, CH, CY, DE, DK, ES, FI, FR, GB, GR, IE, IT, LU, MC, NL, PT, SE), OAPI patent (BF, BJ, CF, CG, CI, CM, GA, GN, GW, ML, MR, NE, SN, TD, TG).
- Published:  
— With international search report.
- For two-letter codes and other abbreviations, refer to the "Guidance Notes on Codes and Abbreviations" appearing at the beginning of each regular issue of the PCT Gazette.

(54) Title: POLYUREA-BASED ADHESIVES, ARTICLES THEREFROM, AND METHODS OF THEIR PREPARATION AND USE

(57) Abstract: Adhesive compositions of the invention are useful as pressure-sensitive-adhesives and heat-activatable adhesives. Advantageously, adhesive compositions of the invention comprise polymers that are polyurea-based. Adhesive compositions of the invention are useful in a wide variety of applications, including adhesive tapes. One method of preparing such adhesive compositions includes providing at least one polyisocyanate; providing at least one polyamine; reacting the at least one polyisocyanate with the at least one polyamine to form the polyurea-based polymer; and optionally adding a tackifier to the polyurea-based polymer.

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# PCT

## INTERNATIONAL SEARCH REPORT

(PCT Article 18 and Rules 43 and 44)

Applicant's or agent's file reference <b>54545PCT4A</b>	<b>FOR FURTHER ACTION</b> see Notification of Transmittal of International Search Report (Form PCT/ISA/220) as well as, where applicable, item 5 below.	
International application No. <b>PCT/US 99/ 12687</b>	International filing date (day/month/year) <b>07/06/1999</b>	(Earliest) Priority Date (day/month/year)
Applicant <b>3M INNOVATIVE PROPERTIES COMPANY</b>		

This International Search Report has been prepared by this International Searching Authority and is transmitted to the applicant according to Article 18. A copy is being transmitted to the International Bureau.

This International Search Report consists of a total of 3 sheets.

☒ It is also accompanied by a copy of each prior art document cited in this report.

### 1. Basis of the report

- a. With regard to the **language**, the international search was carried out on the basis of the international application in the language in which it was filed, unless otherwise indicated under this item.

☐ the international search was carried out on the basis of a translation of the international application furnished to this Authority (Rule 23.1(b)).

- b. With regard to any **nucleotide and/or amino acid sequence** disclosed in the international application, the international search was carried out on the basis of the sequence listing :

☐ contained in the international application in written form.

☐ filed together with the international application in computer readable form.

☐ furnished subsequently to this Authority in written form.

☐ furnished subsequently to this Authority in computer readable form.

☐ the statement that the subsequently furnished written sequence listing does not go beyond the disclosure in the international application as filed has been furnished.

☐ the statement that the information recorded in computer readable form is identical to the written sequence listing has been furnished

2. ☐ **Certain claims were found unsearchable** (See Box I).

3. ☐ **Unity of invention is lacking** (see Box II).

4. With regard to the **title**,

☒ the text is approved as submitted by the applicant.

☐ the text has been established by this Authority to read as follows:

5. With regard to the **abstract**,

☒ the text is approved as submitted by the applicant.

☐ the text has been established, according to Rule 38.2(b), by this Authority as it appears in Box III. The applicant may, within one month from the date of mailing of this international search report, submit comments to this Authority.

6. The figure of the **drawings** to be published with the abstract is Figure No.

☐ as suggested by the applicant.

☐ because the applicant failed to suggest a figure.

☐ because this figure better characterizes the invention.

☒ None of the figures.

FEB 15 2000

From the INTERNATIONAL SEARCHING AUTHORITY

PCT

Lisa M. McGeehan

To:

3M Innovative Properties Company  
Office of Intell. Property Counsel  
Attn. MCGEEHAN, Lisa M.  
P.O. Box 33427  
St. Paul, Minnesota 55133-3427  
UNITED STATES OF AMERICA

OFFICE OF THE INTERNATIONAL SEARCH REPORT  
OR THE DECLARATION

FEB 14 2000

(PCT Rule 44.1)

REFERRED TO

4/04/2000

Date of mailing  
(day/month/year)

04/02/2000

Applicant's or agent's file reference

54545PCT4A .003

FOR FURTHER ACTION

See paragraphs 1 and 4 below

International application No.

PCT/US 99/12687

International filing date  
(day/month/year)

07/06/1999

Applicant

3M INNOVATIVE PROPERTIES COMPANY

1. ☒ The applicant is hereby notified that the International Search Report has been established and is transmitted herewith.

**Filing of amendments and statement under Article 19:**

The applicant is entitled, if he so wishes, to amend the claims of the International Application (see Rule 46):

**When?** The time limit for filing such amendments is normally 2 months from the date of transmittal of the International Search Report; however, for more details, see the notes on the accompanying sheet.

**Where?** Directly to the International Bureau of WIPO  
34, chemin des Colombettes  
1211 Geneva 20, Switzerland  
Fascimile No.: (41-22) 740.14.35

For more detailed instructions, see the notes on the accompanying sheet.

CITE  
ART TO  
U.S.P.T.O.?

3/4/2000

USA 6A.002

2. ☐ The applicant is hereby notified that no International Search Report will be established and that the declaration under Article 17(2)(a) to that effect is transmitted herewith.

3. ☐ With regard to the protest against payment of (an) additional fee(s) under Rule 40.2, the applicant is notified that:

☐ the protest together with the decision thereon has been transmitted to the International Bureau together with the applicant's request to forward the texts of both the protest and the decision thereon to the designated Offices.

☐ no decision has been made yet on the protest; the applicant will be notified as soon as a decision is made.

4. **Further action(s):** The applicant is reminded of the following:

Shortly after 18 months from the priority date, the international application will be published by the International Bureau. If the applicant wishes to avoid or postpone publication, a notice of withdrawal of the international application, or of the priority claim, must reach the International Bureau as provided in Rules 90bis.1 and 90bis.3, respectively, before the completion of the technical preparations for international publication.

Within 19 months from the priority date, a demand for international preliminary examination must be filed if the applicant wishes to postpone the entry into the national phase until 30 months from the priority date (in some Offices even later).

Within 20 months from the priority date, the applicant must perform the prescribed acts for entry into the national phase before all designated Offices which have not been elected in the demand or in a later election within 19 months from the priority date or could not be elected because they are not bound by Chapter II.

Name and mailing address of the International Searching Authority



European Patent Office, P.B. 5818 Patentlaan 2  
NL-2280 HV Rijswijk  
Tel. (+31-70) 340-2040, Tx. 31 651 epo nl,  
Fax: (+31-70) 340-3016

Authorized officer

Alfredo Prein



These Notes are intended to give the basic instructions concerning the filing of amendments under article 19. The Notes are based on the requirements of the Patent Cooperation Treaty, the Regulations and the Administrative Instructions under that Treaty. In case of discrepancy between these Notes and those requirements, the latter are applicable. For more detailed information, see also the PCT Applicant's Guide, a publication of WIPO.

In these Notes, "Article", "Rule", and "Section" refer to the provisions of the PCT, the PCT Regulations and the PCT Administrative Instructions respectively.

## INSTRUCTIONS CONCERNING AMENDMENTS UNDER ARTICLE 19

The applicant has, after having received the international search report, one opportunity to amend the claims of the international application. It should however be emphasized that, since all parts of the international application (claims, description and drawings) may be amended during the international preliminary examination procedure, there is usually no need to file amendments of the claims under Article 19 except where, e.g. the applicant wants the latter to be published for the purposes of provisional protection or has another reason for amending the claims before international publication. Furthermore, it should be emphasized that provisional protection is available in some States only.

### What parts of the international application may be amended?

Under Article 19, only the claims may be amended.

During the international phase, the claims may also be amended (or further amended) under Article 34 before the International Preliminary Examining Authority. The description and drawings may only be amended under Article 34 before the International Examining Authority.

Upon entry into the national phase, all parts of the international application may be amended under Article 28 or, where applicable, Article 41.

### When?

Within 2 months from the date of transmittal of the international search report or 16 months from the priority date, whichever time limit expires later. It should be noted, however, that the amendments will be considered as having been received on time if they are received by the International Bureau after the expiration of the applicable time limit but before the completion of the technical preparations for international publication (Rule 46.1).

### Where not to file the amendments?

The amendments may only be filed with the International Bureau and not with the receiving Office or the International Searching Authority (Rule 46.2).

Where a demand for international preliminary examination has been/is filed, see below.

### How?

Either by cancelling one or more entire claims, by adding one or more new claims or by amending the text of one or more of the claims as filed.

A replacement sheet must be submitted for each sheet of the claims which, on account of an amendment or amendments, differs from the sheet originally filed.

All the claims appearing on a replacement sheet must be numbered in Arabic numerals. Where a claim is cancelled, no renumbering of the other claims is required. In all cases where claims are renumbered, they must be renumbered consecutively (Administrative Instructions, Section 205(b)).

The amendments must be made in the language in which the international application is to be published.

### What documents must/may accompany the amendments?

#### Letter (Section 205(b)):

The amendments must be submitted with a letter.

The letter will not be published with the international application and the amended claims. It should not be confused with the "Statement under Article 19(1)" (see below, under "Statement under Article 19(1)").

The letter must be in English or French, at the choice of the applicant. However, if the language of the international application is English, the letter must be in English; if the language of the international application is French, the letter must be in French.

The letter must indicate the differences between the claims as filed and the claims as amended. It must, in particular, indicate, in connection with each claim appearing in the international application (it being understood that identical indications concerning several claims may be grouped), whether

- (i) the claim is unchanged;
- (ii) the claim is cancelled;
- (iii) the claim is new;
- (iv) the claim replaces one or more claims as filed;
- (v) the claim is the result of the division of a claim as filed.

The following examples illustrate the manner in which amendments must be explained in the accompanying letter:

1. [Where originally there were 48 claims and after amendment of some claims there are 51]:  
"Claims 1 to 29, 31, 32, 34, 35, 37 to 48 replaced by amended claims bearing the same numbers; claims 30, 33 and 36 unchanged; new claims 49 to 51 added."
2. [Where originally there were 15 claims and after amendment of all claims there are 11]:  
"Claims 1 to 15 replaced by amended claims 1 to 11."
3. [Where originally there were 14 claims and the amendments consist in cancelling some claims and in adding new claims]:  
"Claims 1 to 6 and 14 unchanged; claims 7 to 13 cancelled; new claims 15, 16 and 17 added." or  
"Claims 7 to 13 cancelled; new claims 15, 16 and 17 added; all other claims unchanged."
4. [Where various kinds of amendments are made]:  
"Claims 1-10 unchanged; claims 11 to 13, 18 and 19 cancelled; claims 14, 15 and 16 replaced by amended claim 14; claim 17 subdivided into amended claims 15, 16 and 17; new claims 20 and 21 added."

**"Statement under article 19(1)" (Rule 46.4)**

The amendments may be accompanied by a statement explaining the amendments and indicating any impact that such amendments might have on the description and the drawings (which cannot be amended under Article 19(1)).

The statement will be published with the international application and the amended claims.

**It must be in the language in which the international application is to be published.**

It must be brief, not exceeding 500 words if in English or if translated into English.

It should not be confused with and does not replace the letter indicating the differences between the claims as filed and as amended. It must be filed on a separate sheet and must be identified as such by a heading, preferably by using the words "Statement under Article 19(1)."

It may not contain any disparaging comments on the international search report or the relevance of citations contained in that report. Reference to citations, relevant to a given claim, contained in the international search report may be made only in connection with an amendment of that claim.

**Consequence if a demand for international preliminary examination has already been filed**

If, at the time of filing any amendments under Article 19, a demand for international preliminary examination has already been submitted, the applicant must preferably, at the same time of filing the amendments with the International Bureau, also file a copy of such amendments with the International Preliminary Examining Authority (see Rule 62.2(a), first sentence).

**Consequence with regard to translation of the international application for entry into the national phase**

The applicant's attention is drawn to the fact that, where upon entry into the national phase, a translation of the claims as amended under Article 19 may have to be furnished to the designated/elected Offices, instead of, or in addition to, the translation of the claims as filed.

For further details on the requirements of each designated/elected Office, see Volume II of the PCT Applicant's Guide.

# PATENT COOPERATION TREATY

# PCT

## INTERNATIONAL SEARCH REPORT

(PCT Article 18 and Rules 43 and 44)

Applicant's or agent's file reference <b>54545PCT4A</b>	<b>FOR FURTHER ACTION</b> see Notification of Transmittal of International Search Report (Form PCT/ISA/220) as well as, where applicable, item 5 below.	
International application No. <b>PCT/US 99/ 12687</b>	International filing date (day/month/year) <b>07/06/1999</b>	(Earliest) Priority Date (day/month/year)
Applicant  <b>3M INNOVATIVE PROPERTIES COMPANY</b>		

This International Search Report has been prepared by this International Searching Authority and is transmitted to the applicant according to Article 18. A copy is being transmitted to the International Bureau.

This International Search Report consists of a total of 3 sheets.



It is also accompanied by a copy of each prior art document cited in this report.

**1. Basis of the report**

- a. With regard to the **language**, the international search was carried out on the basis of the international application in the language in which it was filed, unless otherwise indicated under this item.



the international search was carried out on the basis of a translation of the international application furnished to this Authority (Rule 23.1(b)).

- b. With regard to any **nucleotide and/or amino acid sequence** disclosed in the international application, the international search was carried out on the basis of the sequence listing :



contained in the international application in written form.



filed together with the international application in computer readable form.



furnished subsequently to this Authority in written form.



furnished subsequently to this Authority in computer readable form.



the statement that the subsequently furnished written sequence listing does not go beyond the disclosure in the international application as filed has been furnished.



the statement that the information recorded in computer readable form is identical to the written sequence listing has been furnished

2. ☐ **Certain claims were found unsearchable** (See Box I).

3. ☐ **Unity of invention is lacking** (see Box II).

4. With regard to the **title**,



the text is approved as submitted by the applicant.



the text has been established by this Authority to read as follows:

5. With regard to the **abstract**,



the text is approved as submitted by the applicant.



the text has been established, according to Rule 38.2(b), by this Authority as it appears in Box III. The applicant may, within one month from the date of mailing of this international search report, submit comments to this Authority.

6. The figure of the **drawings** to be published with the abstract is Figure No.



as suggested by the applicant.



because the applicant failed to suggest a figure.



because this figure better characterizes the invention.



None of the figures.

TENT COOPERATION TRF Y

PCT

NOTIFICATION OF ELECTION

(PCT Rule 61.2)

From the INTERNATIONAL BUREAU

To:

Commissioner  
US Department of Commerce  
United States Patent and Trademark  
Office, PCT  
2011 South Clark Place Room  
CP2/5C24  
Arlington, VA 22202  
ETATS-UNIS D'AMERIQUE

in its capacity as elected Office

Date of mailing:

14 December 2000 (14.12.00)

International application No.:

PCT/US99/12687

Applicant's or agent's file reference:

54545PCT4A

International filing date:

07 June 1999 (07.06.99)

Priority date:

Applicant:

KINNING, David, J. et al

1. The designated Office is hereby notified of its election made:



in the demand filed with the International preliminary Examining Authority on:

09 March 2000 (09.03.00)



in a notice effecting later election filed with the International Bureau on:

2. The election ☒ was



was not

made before the expiration of 19 months from the priority date or, where Rule 32 applies, within the time limit under Rule 32.2(b).

The International Bureau of WIPO  
34, chemin des Colombettes  
1211 Geneva 20, Switzerland

Facsimile No.: (41-22) 740.14.35

Authorized officer:

J. Zahra

Telephone No.: (41-22) 338.83.38

## INTERNATIONAL SEARCH REPORT

International Application No

US 99/12687

A. CLASSIFICATION OF SUBJECT MATTER  
 IPC 7 C08G18/50 C09J175/02 C09J175/12

According to International Patent Classification (IPC) or to both national classification and IPC

## B. FIELDS SEARCHED

Minimum documentation searched (classification system followed by classification symbols)  
 IPC 7 C08G C09J

Documentation searched other than minimum documentation to the extent that such documents are included in the fields searched

Electronic data base consulted during the international search (name of data base and, where practical, search terms used)

## C. DOCUMENTS CONSIDERED TO BE RELEVANT

Category *	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
X	✓ EP 0 380 236 A (MINNESOTA MINING & MFG) 1 August 1990 (1990-08-01)  page 2, line 49 -page 3, line 42 examples 22-24,27; tables III,IV	1,2,4, 10-12, 19,26, 31,34
A	EP 0 440 934 A (MOBAY CORP) 14 August 1991 (1991-08-14)  page 2, line 39 -page 3, line 5 page 6	1,5-8, 13,24, 31,37
A	US 5 109 096 A (AREND GUENTER ET AL) 28 April 1992 (1992-04-28)  example 1	1,5-8, 21,22, 24,31, 36,37

☒ Further documents are listed in the continuation of box C.

☒ Patent family members are listed in annex.

## \* Special categories of cited documents:

- "A" document defining the general state of the art which is not considered to be of particular relevance  
 "E" earlier document but published on or after the international filing date  
 "L" document which may throw doubts on priority claim(s) or which is cited to establish the publication date of another citation or other special reason (as specified)  
 "O" document referring to an oral disclosure, use, exhibition or other means  
 "P" document published prior to the international filing date but later than the priority date claimed

- "T" later document published after the international filing date or priority date and not in conflict with the application but cited to understand the principle or theory underlying the invention  
 "X" document of particular relevance; the claimed invention cannot be considered novel or cannot be considered to involve an inventive step when the document is taken alone  
 "Y" document of particular relevance; the claimed invention cannot be considered to involve an inventive step when the document is combined with one or more other such documents, such combination being obvious to a person skilled in the art.  
 "&" document member of the same patent family

Date of the actual completion of the international search

25 January 2000

Date of mailing of the international search report

04/02/2000

Name and mailing address of the ISA

European Patent Office, P.B. 5818 Patentlaan 2  
 NL - 2280 HV Rijswijk  
 Tel. (+31-70) 340-2040, Tx. 31 651 epo nl,  
 Fax: (+31-70) 340-3016

Authorized officer

Neugebauer, U

# INTERNATIONAL SEARCH REPORT

International Application No  
 /US 99/12687

## C.(Continuation) DOCUMENTS CONSIDERED TO BE RELEVANT

Category *	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
A	US 5 047 272 A (HASSEL TILLMANN ET AL) 10 September 1991 (1991-09-10) example 1 -----	31,32

## INTERNATIONAL SEARCH REPORT

Information on patent family members

International Application No

US 99/12687

Patent document cited in search report		Publication date	Patent family member(s)	Publication date
EP 0380236	A	01-08-1990	CA 2007162 A	23-07-1990
			DE 69019180 D	14-06-1995
			DE 69019180 T	11-01-1996
			ES 2071757 T	01-07-1995
			HK 1007754 A	23-04-1999
			JP 2252718 A	11-10-1990
			MX 170401 B	19-08-1993
EP 0440934	A	14-08-1991	US 4994540 A	19-02-1991
			CA 2033888 A	17-07-1991
			JP 4211486 A	03-08-1992
US 5109096	A	28-04-1992	DE 3919697 A	20-12-1990
			AT 99342 T	15-01-1994
			CA 2017984 A	16-12-1990
			DD 297984 A	30-01-1992
			DE 59004002 D	10-02-1994
			EP 0402728 A	19-12-1990
			ES 2062182 T	16-12-1994
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US 5047272	A	10-09-1991	DE 3842966 A	28-06-1990
			CA 2005969 A	21-06-1990
			DE 58909411 D	05-10-1995
			EP 0374629 A	27-06-1990
			JP 2703635 B	26-01-1998
			JP 3007335 A	14-01-1991